Aluminum alloy laser welding of energy storage box

What is aluminum alloy laser welding?

The current research focus in aluminum alloy laser welding is the use of a composite processthat combines the high energy density of laser beams with the wider heating range of arcs,utilizing the strengths of both heat sources and enhancing their characteristics of high energy density and stable arcs.

Can a laser arc be used to weld aluminum alloys?

For materials with high reflectivity such as aluminum alloy,hybrid laser weldingcan preheat or melt the material surface using arc energy,significantly improving the absorption of laser energy by the aluminum alloy. Shida et al. successfully used a 10 kW CO2 laser in conjunction with TIG and MIG arcs to weld aluminum alloys.

What are the advantages of laser welding of aluminum alloys?

Laser welding of aluminum alloys offers significant advantages over conventional fusion welding techniques,including highly focused heat input,superior weld depth-to-width ratios,and minimal structural deformation. However,this advanced process also presents unique challenges:

What are the process parameters of aluminum alloy laser welding?

The process parameters of aluminum alloy laser welding typically include laser power,defocus,welding speed,and the composition and flow of gas protection. These parameters not only impact the protective effect of the welding area,but also affect the stability of the laser deep penetration welding process,which in turn affects weld porosity.

Can a 10 kW CO2 laser be used to weld aluminum alloys?

Shida et al. successfullyused a 10 kW CO2 laser in conjunction with TIG and MIG arcs to weld aluminum alloys. The introduction of arcs improved the laser energy utilization rate and increased the weld penetration ratio by 5-20%. The result was a smooth,well-formed weld surface.

What are the disadvantages of laser welding of aluminium alloys?

The main difficulties in laser welding of aluminium alloys are [18,30]: High reflectivity with high thermal conductivity. Therefore,higher power density (as compared to steel) must be supplied to the welding area to melt aluminium,and it may lead to softening in the heat affected zone and weld metal.

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